an excited light to the detecting region from the side surface of the electrophoretic chip.

The fluorescent-light detecting device shown in FIG. 3 includes the first optical system for focusing, for image formation, a light from the detecting region to the slit hole and the second optical system provided with at least a reflection-type diffraction grating to separate the light from the slit hole and focus it, for image formation, onto an detecting element, to thereby separate the light from the detecting region using the reflection-type diffraction grating having a higher diffraction efficiency than the that of a transparent diffraction grating, thus enabling realizing a high S/N ratio for the detection signal at the detecting element. Furthermore, even in detection of a fluorescent light in such a detecting region that covers a plurality of detecting positions, the cross-talk can be reduced by the high image-formation characteristics of the reflection-type diffraction grating.

By providing such a configuration that a reflection-type concave grating is provided as the reflection-type diffraction grating and also that the second optical system is comprised of only a reflection-type concave grating, it is possible to separate a light from the slit hole and focus it, for image formation, onto the detecting element without using such optical systems as the concave mirror. This simplifies the configuration of the device.

FIG. 4 is a perspective view for showing another fluorescent-light detecting device.

In the electrophoretic chip 1 is formed a plurality of the separation passages 13, at a predetermined position along which is provided the linear detecting region 29. A laser device 59 provided beside the electrophoretic chip 1 causes an excited light to be applied to the detecting region 29 and simultaneously to a plurality of the separation passages 13.

A convergence lens 61 provided above the electrophoretic chip 1 collimates the light from a specific one of the separation passages 13 in the detecting region 29. This collimated light is sent through a removing filter 63 for removing a laser beam to a transparent diffraction grating 65. The transparent diffraction grating 65 separates the collimated light from the removing filter 63 to focus it, for image formation, onto a CCD 69 through an image-forming lens 67.

The lights with different wavelength are focused, for image formation, at different positions on the CCD 69. Based on a detection signal from the CCD 69 is calculated an intensity of a predetermined fluorescent-light wavelength. By thus checking the intensity of the fluorescent-light wavelength, it is possible to decide the presence of a fluorescent material which emits a fluorescent light in the detecting region 29.

In the fluorescent-light detecting device shown in FIG. 4, by moving toward the detecting region 29 the electrophoretic chip 1 or the optical system including the convergence lens 61, the removing filter 63, the transparent diffraction grating 65, the image forming lens 67 and the CCD 69, the fluorescent light is detected over a plurality of the separation passages 13 in the detecting region 29.

In the electrophoretic apparatus using an electrophoretic chip, when a voltage is applied to guide a specimen injected in the specimen reservoir to an intersection between the specimen-introducing passage and the separation passage, the specimen should be distributed uniformly throughout along the specimen-introducing passage; that is, such injection conditions for guiding a sufficient amount of the specimen to the intersection between the specimen-introducing passage and the separation passage as a value of a voltage applied across the passages and a voltage application time or a temperature must be discussed for each passage design or specimen. Conventionally, the injection conditions have been discussed using a monitor different from the electrophoretic apparatus.

However, when the electrophoretic chip is mounted to the electrophoretic apparatus and a voltage is applied to guide a specimen to an intersection between the specimen-introducing passage and the separation passage of the electrophoretic chip under the injection condition obtained using the above-mentioned monitor, the sample sometimes cannot be distributed uniformly throughout the specimen-introducing passage by some disorder. Although the result of measurement obtained when the specimen is injected into the separation passage under the condition that the specimen is not distributed uniformly throughout the specimen-introducing passage is deficient in reliability,

the specimen distribution along the specimen-introducing passage when it is injected therein could not be confirmed.

The following will describe an embodiment of an electrophoretic apparatus provided with such a specimen-injection monitor mechanism that detects a specimen distribution along the specimen-injection passage including at least the intersection between the specimen-inject passage and the separation passage to improve the reliability of the measurement result.

FIG. 5 is a schematic configuration diagram for showing one embodiment of an electrophoretic apparatus provided with such a specimen-injection monitor mechanism. The electrophoretic chip 1 shown in FIG. 5 is the same as that of FIG. 2.

The electrophoretic chip 1 is held on a chip holding station (not shown) with its surface in which the reservoirs are formed facing upward. The chip holding station is provided with a temperature regulating mechanism for regulating the temperature of the chip 1.

Such an excitation light-source laser device 71 is provided that is commonly used in a separation-peak detecting optical system and a specimen-injection monitor optical system which shall be described later. The laser device 71 may be of a variety of types such as argon (Ar) laser, kripton (Kr) laser, helium-neon (He-Ne) laser, Nd-ion solid laser made of neodium (Nd)-Yag ($Y_3Al_5O_{12}$) and the like, semiconductor laser (Laser Diode: LD), solid laser utilizing the phenomenon of optical second harmonic-wave generation (SHG).

Along an optical path for an excited light from the laser device 71 is provided a beam expander 73 for collimating the excited light. Along an optical path for the excited light from the beam expander 73 is provided a movable reflection mirror 75 which is moved between a position indicated by a solid line along the optical path and a position indicated by a broken line out of the optical path.

Along an optical path for the excited light reflected by the movable reflection mirror 75 is provided a lens 77 for expanding the excited light. Along an optical path for the excited light from the lens 77 is provided a dichroic mirror 79 arranged on the side of the bottom of the chip 1 (opposite the surface in which the